TEJUS
CONSULTANTS

GRADATION FOR GSB
(As per MORT&H 400-1,Grading-II)

Name of Work	:	The Work of Improvements to Sanitary work in ward No. 08, Kodigehalli
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	M/S KRIDL
Date of Testing	:	03-01-2020
Type of Mix	:	GSB
Sample I/D	:	GSB1

Sample Location:	At plant	**Date of Sampling:**	02-01-2020
		Date of testing:	03-01-2020
Type of material & Purpose:	GSB	**Oven Dry Wt.(gms):**	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
75	0	0	0.00	100.00	-
53	0	0	0.00	100.00	100.00
26.5	2200	2200	22.00	78.00	70-100
9.5	2230	4430	44.30	55.70	50-80
4.75	900	5330	53.30	46.70	40-65
2.36	1215	6545	65.45	34.55	30-50
0.425	2100	8645	86.45	13.55	10-15
0.075	980	9625	96.25	3.75	<5
Pan	375.0				
Total	**10000.0**				

Asst. Executive Engineer
Project Division
Yelahanka Zone
BBMP, Bangalore

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Authorised Signatory

TEJUS CONSULTANTS
No. 58, 3rd main, 6th Cross, 1st Stage KHB Colony, Basaveshwaranagar, Bangalore - 560079, O : +91 80 23287532, tejusconsultants@gmail.com

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Project	Improvements to Sanitary works in Ward No.08, Kodigehalli		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor			
Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28))			
Date of Sampling	02-01-2020		
Date of Testing	03-01-2020		
Layer no. or level	GSB layer		
Depth of hole	200mm		
Calibrating Container Properties			
Diameter	10.00	cm	
Area	78.50	cm^2	
Height	12.73	cm	
Volume of Calibrating Container = Area X Height	999.305	cm^3	
Volume V (nearly)	1000	cm^3	
Observation and Calculations	1	1	1
Volume of Calibrating Container V cm^3	1000	1000	1000
Wt of Cylinder + Sand (Before Pouring) W_1 gm	7485	7495	7465
Mean Wt of Cylinder + Sand (After Pouring) W_2 gm	5615	5620	5610
Mean Wt of Sand (Glass Plate) in Cone (of Pouring Cylinder) W_3 gm	436	450	460
Wt. of sand to fill Clibrating Container is $(W_a)=(W_1-W_2-W_3)$ gms.	1434	1425	1395
Bulk density of sand ($\gamma_s = W_a/V$) gm/cc	1.43	1.43	1.40
Dry Density of Soil			
Wt of wet soil from hole W_w gm	2015	2010	2020
Wt of Cylinder + Sand (Before Pouring) W_1 gm	7485	7495	7465
Mean Wt of Cylinder + Sand (After Pouring) W_4 gm	5620	5625	5610
Wt of Sand in hole $W_b = (W_1-W_4-W_3)$	1429	1420	1395
Volume of hole is $V_h = W_b / \gamma_s$	996.5	996.5	1000.0
Bulk density of material(i.e. wt. of the wet material) (γ_b)= (W_w / W_b) X γs g/cm^3	2.02	2.02	2.02
Water Content of the Soil is w	13.63	13.63	13.63

Asst. Executive Engineer Yeshwanthpur Sub Division BWSSB

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Dry density of material(i.e. wt. of the wet material) (γ_d)= (γ_b / 1+w) g/cm^3	1.78	1.78	1.78
Result			
FDD	1.78	1.78	1.78
MDD	1.80	1.80	1.80
OMC in %	13.63	13.63	13.63
% compaction obtained	98.86	98.62	98.76
% compaction required	98%	98%	98%

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

Project	The Work of Improvements to Sanitary work in ward No. 08, Kodigehalli		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	M/s KRIDL		
Proposed Use	WMM	**Date of Sampling**	08-01-2020
Sample Location	At plant	**Date of Testing**	08-01-2020

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone peces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	356.00	350.00	365.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	270.00	265.00	274.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	86.00	85.00	91.00	
4	Aggregate Impact Value (%)	(Wc/Wa)* 100	24.16	24.29	24.93	
5	Average Aggregate impact value	(%)	24.46			Max - 30 %

Asst. Executive Engineer
Project Division
Bruhat Bangalore Zone 92

Remarks : ✓ Satisfactory / Not Satisfactory

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

TEJUS CONSULTANTS

Project	The Work of Improvements to Sanitary work in ward No. 08, Kodigehalli		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	M/S KRIDL		
Type of Material	WMM	Proposed Use	WMM
Sample Location	At plant	Date of Sampling	08-01-2020
		Date of Testing	08-01-2020

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	900	80	800	60
16.0	12.5	1230	120	1105	110
12.5	10.0	510	60	420	80
10.0	6.3	580	75	495	50
Total		3220	335	2820	300

Asst. Executive Engineer
P.R.O. Division

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.40
Elongation Index(%):	10.64
Combined FI+EL (%)	21.04

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	The Work of Improvements to Sanitary work in ward No. 08, Kodigehalli
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	M/S KRIDL
Date of Testing	:	09-01-2020
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	08-01-2020
Type of material & Purpose:	WMM	**Date of testing:**	09-01-2020
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	250	250	2.50	97.50	95-100
22.4	2630	2880	28.80	71.20	60-80
11.2	1790	4670	46.70	53.30	40-60
4.75	1460	6130	61.30	38.70	25-40
2.36	1360	7490	74.90	25.10	15-30
0.6	830	8320	83.20	16.80	8.0-22.0
0.075	950	9270	92.70	7.30	0-8
Pan	730				
Total	**10000**				

Asst. Executive Engineer
Peenya Division A
Peenya Zone-92
Bangalore

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Project	The Work of Improvements to Sanitary work in ward No. 08, Kodigehalli
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	M/S KRIDL

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	08-01-2020
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	1	2	3
Wt. of wet material from hole (Ww) gms.	6200	6250	6230
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9710	9635	9672
Wt. of sand in cone (w3) gms.	836	845	835
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3454	3520	3493
Bulk density of sand (ys)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.35	2.34	2.34
Moisture meter reading(moisture content)	12.66	12.52	12.32
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.09	2.08	2.08
MDD	2.12	2.12	2.12
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.45	98.25	98.12
Compaction Required	98%	98%	98%

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

Project	The Work of Improvements to Sanitary work in ward No. 08, Kodigehalli		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	M/s KRIDL		
Proposed Use	WMM	Date of Sampling	09-01-2020
Sample Location	At plant	Date of Testing	09-01-2020

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	380.00	365.00	380.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	280.00	270.00	280.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	100.00	95.00	100.00	
4	Aggregate Impact Value (%)	(Wc/Wa)* 100	26.32	26.03	26.32	
5	Average Aggregate impact value	(%)	26.22			Max - 30 %
Remarks :			Satisfactory / Not Satisfactory			

Asst. Executive Engineer
Yelahanka Zone, BBMP, Bangalore

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

TEJUS CONSULTANTS

Project	The Work of Improvements to Sanitary work in ward No. 08, Kodigehalli
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	M/S KRIDL

Type of Material	WMM	Proposed Use	WMM
Sample Location	At plant	Date of Sampling	09-01-2020
		Date of Testing	09-01-2020

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	900	60	830	55
16.0	12.5	1260	110	1160	130
12.5	10.0	450	80	380	70
10.0	6.3	500	80	450	50
Total		3110	330	2820	305

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.61
Elongation Index(%):	10.82
Combined FI+EL (%)	21.43

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Bill

TEJUS
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Project	The Work of Improvements to Sanitary work in ward No. 08, Kodigehalli
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	M/S KRIDL

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	09-01-2020		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	**1**	**2**	**3**
Wt. of wet material from hole (Ww) gms.	6510	6525	6514
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9520	9485	9535
Wt. of sand in cone (w3) gms.	835	842	830
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3645	3673	3635
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.34	2.34	2.35
Moisture meter reading(moisture content)	12.42	12.58	12.50
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.08	2.08	2.09
MDD	2.12	2.12	2.12
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.17	98.25	98.43
Compaction Required	98%	98%	98%

Asst. Executive Engineer
Project Division
BBMP, Bangalore

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	The Work of Improvements to Sanitary work in ward No. 08, Kodigehalli
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	M/S KRIDL
Date of Testing	:	10-01-2020
Type of Mix	:	WMM
Sample I/D	:	WMM 2

Sample Location:	At plant	Date of Sampling:	09-01-2020
Type of material & Purpose:	WMM	Date of testing:	10-01-2020
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	270	270	2.70	97.30	95-100
22.4	2600	2870	28.70	71.30	60-80
11.2	1830	4700	47.00	53.00	40-60
4.75	1540	6240	62.40	37.60	25-40
2.36	1450	7690	76.90	23.10	15-30
0.6	860	8550	85.50	14.50	8.0-22.0
0.075	810	9360	93.60	6.40	0-8
Pan	640				
Total	10000				

Asst. Executive Engineer, Project Division, Peenya, BBMP, Bangalore-58

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